No. 10563
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UPDATE FACT SHEET

Waste Area Group 5 environmental investigation nearly complete

WASTE AREA GROUP 5

REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

- Identifies the nature and extent of contamination at a site.
- Provides an assessment of the potential risks associated with a site.
- Provides a full analysis of cleanup alternatives.

REMEDIAL ALTERNATIVES

Cleanup remedies proposed for a contaminated area.

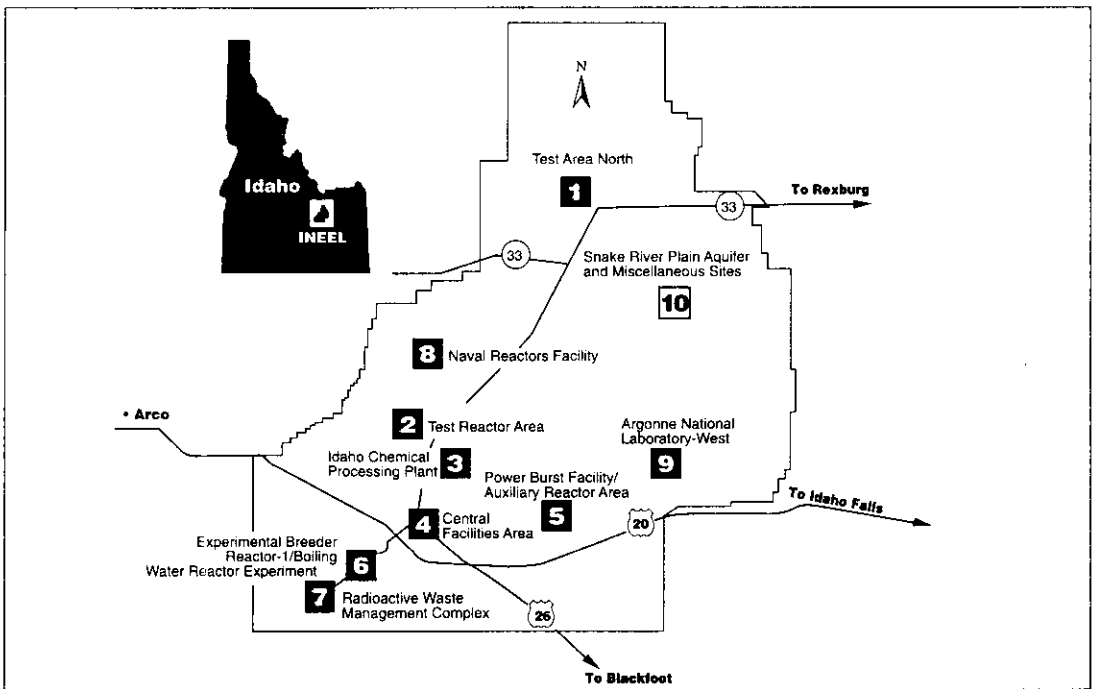
INTRODUCTION

The U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency and state of Idaho are nearly complete with a two-year comprehensive **remedial investigation/feasibility study** of Waste Area Group 5, Operable Unit 5-12 (Power Burst Facility and Auxiliary Reactor Area) at the Idaho National Engineering and Environmental Laboratory. During this time, the agencies collected data to determine the extent of contamination associated with Waste Area Group 5, estimated cumulative risk to human health and the environment and identified **remedial alternatives** that would reduce the risk to acceptable levels.

This fact sheet summarizes information contained in the Waste Area Group 5 comprehensive remedial investigation/feasibility study report.

FACILITY BACKGROUND

The Power Burst Facility and Auxiliary Reactor Area are located in the south-central portion of the INEEL approximately 50 miles from the cities of Idaho Falls and



Location of Waste Area Group 5 with respect to other waste area groups.

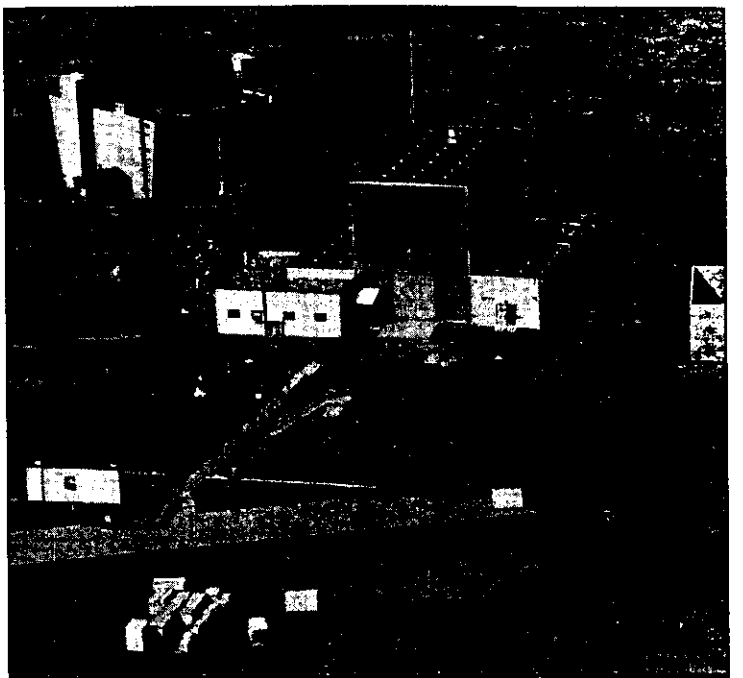
Burial Ground

Two trenches and a pit that were used to dispose of contaminated soil and debris. The area was then covered with clean soil.

Injection Well

Injection wells were used at the INEEL in the past to dispose of wastewater. Although some injection wells were used to inject wastewater directly into the Snake River Plain Aquifer, those used within Waste Area Group 5 injected wastewater into the area between the ground surface and aquifer: an area known as the vadose zone. Once a common industrial practice, injection wells are no longer used at the INEEL. Both injection wells at Waste Area Group 5 are recommended for no further action.

Pocatello. The Power Burst Facility initially consisted of four reactors used for testing reactor behavior during other-than-normal operating conditions (off-normal) and for safety studies on light-water-moderated, enriched-fuel systems. These tests, called the Special Power Excursion Reactor Tests, began in the late 1950s and continued until the 1980s when all the reactors were removed and the facilities were converted to other uses.



Aerial photo of the Power Burst Facility reactor. The reactor is no longer in service.

Today the Power Burst Facility consists of five separate operational areas: the Power Burst Facility Control Area, Power Burst Facility reactor, Waste Experimental Reduction Facility, Waste Engineering Development Facility and Mixed Waste Storage Facility. In 1970, the Power Burst Facility reactor was built to study fuel behavior during normal and off-normal conditions. In 1985, the reactor was placed on standby and in 1997 the reactor was shut down. The reactor support facilities have since been converted to support other programs, including development of radioactive waste volume-reduction techniques and waste treatment research.

The Auxiliary Reactor Area-II facility is the former site of the Stationary Low-Power Reactor-1 (pictured).

The Auxiliary Reactor Area consists of four separate operational facilities constructed in the late 1950s to test portable power reactors for the U.S. Army. The Auxiliary Reactor Area-I, -II and -III facilities are no longer used and are currently in varying stages of decontamination and dismantlement. Auxiliary Reactor Area-IV facility was decontaminated and decommissioned in 1984 and 1985, but still serves as a testing area for explosives.

Waste Area Group 5 currently consists of 55 sites divided into 13 operable units. The sites include evaporation ponds, sanitary sewer systems, waste sumps, a **burial ground**, contaminated soil areas, **injection wells** and several storage tanks.

What sites were examined during the comprehensive investigation?

The two-year comprehensive remedial investigation/feasibility study consisted of examining previous investigations of all Waste Area Group 5 sites to identify and sample the sites where gaps in the data existed. The new data were combined with information from previous remedial investigations, **interim actions**, **Track 1s** and **Track 2s** to determine the nature and extent of contamination associated with the Waste Area Group 5 sites.

Additionally, a Hummer military vehicle equipped with a radiation detector was used to determine the extent of soil contamination at Waste Area Group 5. This effort resulted in the collection of nearly 82,000 measurements, which were used to produce vivid color maps showing the distribution and quantitative aspects of the cesium-137 contamination at the site.

During the data collection, scientists were given a more accurate "picture" of the site, reducing the estimated volume of contaminated soils from 66,000 cubic yards to 47,000 cubic yards.

What were the results of the risk assessment?

The **baseline risk assessment** evaluated the potential adverse effects of contamination on human health and the environment. Future residents and current and future workers were considered. Risks to human health and **ecological receptors** associated with exposure to radionuclides, metals and organic contaminants were estimated. The risk evaluation is called a baseline risk assessment because risk estimates are developed using the assumption that no protective measures are implemented.

Human Health Evaluation

Contaminants with the greatest potential for causing adverse human health effects to a future resident at Waste Area Group 5 include six radionuclides (silver-108m, cesium-137, radium-226, uranium-234, uranium-235 and uranium-238), one organic contaminant [polychlorinated biphenyls (PCBs)], one metal (arsenic) and the contents of the ARA-16 tank. Cleanup decisions are generally made at risk levels corresponding to a cancer incidence of 1 in 10,000 to 1 in 1 million. For risk levels greater than 1 in 10,000, risk management decisions about the proper course of action are made. For Waste Area Group 5, four sites were identified in the baseline risk assessment as containing contaminants that could increase the cancer risk by 1 in 10,000 to a **hypothetical future resident**. At Waste Area Group 5, radionuclide contamination in shallow soils represents the greatest health risk identified.

Noncarcinogenic effects are expressed in terms of a hazard index for each contaminant assessed. Hazard indices are compared to a threshold value of 1.0, as the level below which there is very little potential for noncarcinogenic effects on exposed individuals.

Interim Action

An action taken to address an immediate threat or when the problem is well-defined.

Track 1

Preliminary assessment; study existing knowledge of the site.

Track 2

Same as Track 1, but in addition, field work may be required.

Baseline Risk Assessment

An assessment used to evaluate potential risks to human health and the environment.

Ecological Receptors

A plant or animal that may be exposed to a contaminant.

Hypothetical Future Resident

Someone who is assumed to live at the site in the future.

INEEL Information Repositories

INEEL Technical Library
DOE Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415
(208) 526-1185

University of Idaho Library
University of Idaho Campus
Moscow, ID 83843
(208) 885-6344

Albertson Library
Boise State University
1910 University Drive
Boise, ID 83725
(208) 385-1621

The Administrative Record may be accessed on the Internet by typing http://ar.inel.gov/home.html on the command line. Any library with the Internet can access the Administrative Record. The Waste Area Group 5 investigation (Operable Unit 5-12) is part of the Administrative Record.

Groundwater computer modeling predicted that no contaminants at Waste Area Group 5 would cause unacceptable risk to a hypothetical future resident using the groundwater.

Ecological Risks

An ecological risk assessment was also performed for Waste Area Group 5. The ecological risk assessment evaluated threats to ecological receptors. Contaminants with the greatest potential for causing adverse ecological effects at Waste Area Group 5 are the metals selenium, thallium, copper, lead and mercury. For Waste Area Group 5, three sites were identified in the ecological risk assessment as containing contaminants that could cause adverse effects to ecological receptors.

What alternatives are being considered?

The feasibility study identified potential remedial alternatives based on data obtained during the remedial investigation and baseline risk assessment. Alternatives for three types of contaminant sources were considered: (1) contaminated soil, (2) the seepage pit sludge and structural components of a septic system and (3) the contents and structural components of an underground storage tank. Two alternatives were considered for all three types of waste, No Action and Limited Action.

Alternative 1 -- No Action. Assesses the consequences of leaving the sites in their current states. The only activity associated with this alternative is environmental monitoring.

Alternative 2 -- Limited Action. Includes environmental monitoring and other institutional controls such as fences, signs, access restrictions, land use restrictions, subsidence repairs and runoff control.

Contaminated Soil Sites

In addition to No Action and Limited Action, three additional alternatives were considered for the contaminated soil sites:

Alternative 3 -- Excavation, Consolidation and Containment within Waste Area Group 5. Alternative 3 comprises removing the contaminated soils from the individual sites, consolidating the soils at one location within Waste Area Group 5 and constructing a cap for containment. Institutional controls as described for the Limited Action alternative also would be included.

Alternative 4 -- Removal and Disposal. Contaminated soils would be removed and disposed of outside of Waste Area Group 5. Final disposal facilities within the INEEL, such as at the Radioactive Waste Management Complex, Central Facilities Area landfills and proposed soil repository at the Idaho Nuclear Technology and Engineering Center, were considered. In addition, transporting soils off-Site was evaluated.

Alternative 5 -- Removal, Ex Situ Sorting and Disposal. Involves excavating contaminated soils, separating contaminated soil from the relatively clean soil and disposing of the contaminated soil outside of Waste Area Group 5. After sorting, the

clean soils would be returned to the excavated areas and the contaminated soil would be disposed of as discussed in Alternative 4. Sorting the soils before disposal would reduce the volume of soils for transport and disposition.

Treatability Study Planned

Thermo NUtech will use a soil sorter to test the viability of Alternative 5 in a treatability study planned for 1999. The patented segmented gate system will be used on a 1,000-cubic-yard soil sample to remove radionuclides that are present above proposed cleanup levels. Waste Area Group 5 scientists hope the treatability study will result in an 80- to 90-percent volume reduction in the amount of soil that must be disposed of, resulting in a significant cost savings.

The system works by depositing contaminated soil on a conveyer belt equipped with radiation detectors. Material on the conveyer belt is assayed, and a computer logs the location of any radioactive contamination. If radionuclides are present in the soil above cleanup levels, segmented gates direct the soil to a container for disposal.

Seepage Pit, Septic System/Underground Storage Tank

For the seepage pit contents and structural components of the septic system and the contents and structural components of the underground storage tank, two additional types of remedial actions were assessed.

Alternative 3 -- In Situ Vitrification. An alternative is being developed to vitrify the seepage pit in place. Three variations of in situ vitrification were determined feasible and effective for the underground storage tank: (1) vitrify the tank and soil in place, add a soil cover and implement institutional controls to manage the contaminated media remaining at the site; (2) excavate the intact tank and transport the tank to Test Area North for burial and in situ vitrification, address remaining contaminated soils with the other soil site and decontaminate and dispose of the remaining tank system; and (3) relocate the tank contents to one of the tanks at Test Area North and vitrify in place, address remaining contaminated soils with the other soil sites and decontaminate and dispose of the tank system.

Alternative 4 -- Removal, Ex Situ Thermal Treatment and Disposal. Under Alternative 4, the contents of the seepage pit and the underground storage tank would be removed, placed in appropriate containers and shipped elsewhere on the INEEL for thermal treatment and final disposal. Contaminated soils would be addressed with the other soil sites as described above, and the structural components of both systems would be removed, decontaminated and disposed of appropriately.

No Action Sites

No action sites are those that have no contaminant source or contaminant sources that are determined to be within acceptable risk levels in the baseline risk assessment. Listed below are no action sites that were identified during the investigation:

In Situ Vitrification

The application of an electrical current sufficient to melt the contaminated soil and debris in place, creating a glass-like substance that effectively traps the contamination and reduces mobility.

No Action Sites

The following were identified as no action sites in the Operable Unit 5-05/ 6-01 Record of Decision:

ARA-05: ARA-I Evaporation Pond to NE (ARA-744)

ARA-17: ARA-I Drain (ARA-626)

ARA-13: ARA-III Sanitary Sewer Leach Field and Septic Tank (ARA-740)

PBF-06: PBF Reactor Area Blowdown Pit for Reactor Boiler by PBF-621

PBF-07: PBF Reactor Area Oil Drum Storage (PER-T13)

PBF-13: PBF Reactor Area Rubble Pit

PBF-19: PBF SPERT-III Inactive Fuel Oil Tank (west side of the WERF)

PBF-24: PBF SPERT-IV Blowdown Pit (adjacent to PBF-716).

ARA-04 ARA-I Sewage Treatment Facility (ARA-737) -- This site consists of a chlorinator enclosure used to distribute hypochlorite solution into the sewer system. Currently, the enclosure is completely portable with no lines tying it to any other structure.

ARA-07 ARA-II Seepage Pit to East (ARA-720A) -- This site is an inactive concrete block-lined seepage pit that was the terminus of two septic tanks servicing buildings within ARA-II.

ARA-08 ARA-II Seepage Pit to West (ARA-720B) -- This site is an inactive seepage pit. Cesium-137 is present in surrounding soil, which will be addressed in the remedial design/remedial action for ARA-23.

ARA-09 ARA-II Septic Tank (ARA-738) -- The septic tank and sludge were removed in 1994 from this site.

ARA-11 ARA-II Septic Tank West (ARA-606) -- This site is a septic tank that received sanitary waste from the Administrative and Technical Support Building (ARA-606); the tank was removed in 1995.

ARA-14 ARA-III Septic Tank and Drain Field (ARA-739) -- This site is a concrete septic tank and tile drain field. The tank was removed in 1996, and the waste is being temporarily stored at the ARA-III facility.

ARA-21 ARA-IV Test Area Septic Tank and Leach Pit No. 2 -- An underground septic tank and leach pit that received sanitary waste make up this site. All pipes were removed and the tank and leach pit were covered with soil.

ARA-22 ARA-IV Control Area Septic Tank and Leach Pit No. 3 (ARA-617) -- The ARA-22 septic system has been active since 1959, is still in use and presently receives only sanitary waste.

ARA-24 ARA-III Windblown Soil -- This site consists of nearly all soils surrounding the ARA-III facility and within the facility fence. Nearly all ARA-III structures have been removed.

PBF-01 PBF Control Area Septic Tank (PBF-724), Seepage Pit (PBF-735) -- The PBF-01 site is an underground septic tank and seepage pit that still receives sanitary waste.

PBF-02 PBF Control Area Septic Tanks (PBF-738 and -739), Seepage Pit (PBF-736) -- This site comprises two septic tanks and a seepage pit. The system is still in use and receives sanitary waste from the Control Building.

PBF-03 PBF Control Area Septic Tank for PBF-632 and Seepage Pits (PBF-745 and -748) -- A septic tank and four seepage pits make up this site. The system is still in use and receives sanitary waste from the Support Building.

PBF-08 PBF Reactor Area Corrosive Waste Disposal Sump Brine Tank (PBF-731) -- This site is an unlined concrete sump structure that is still in use. The sump contents were removed and the structure was decontaminated.

PBF-09 PBF Reactor Area Septic Tank and Drain Field (PBF-728) -- A septic tank and drain field that receives sanitary waste from the PBF Reactor building make up this site. The system is still in use.

PBF-17 PBF SPERT-II Septic Tank and Seepage Pit (PBF-725) -- The PBF-17 site consists of a septic tank and seepage pit located north of the SPERT-II. The system is still in use.

PBF-27 PBF SPERT-III Septic Tank (PBF-726) and Seepage Pit -- The PBF-27 site includes a currently-in-use septic tank and seepage pit that receives sanitary waste from the Waste Experimental Reduction Facility building.

PBF-29 PBF Reactor Area Abandoned Fuel Oil Tank -- The PBF-29 site is the location of an abandoned fuel oil tank. The tank was removed in 1996.

No further Action Sites

No further action sites are those where no additional remedial actions or site controls are required to achieve an acceptable risk level. Listed below are the no further action sites identified:

ARA-03 ARA-I Lead Sheeting Pad Near ARA-627 -- This site is a contaminated soil area located east of ARA-I. Lead sheeting was placed over the site for shielding. The sheeting and soil were removed.

ARA-10 Septic Tank East (ARA-613) -- A septic tank received sanitary waste from a building and temporary trailer, but was removed in 1995 and disposed of at the Radioactive Waste Management Complex.

ARA-15 ARA-III Radionuclide Tank (ARA-735) -- This tank, used to support reactor research operations until 1965, was removed, along with its piping, in 1993.

ARA-18 ARA-III Radionuclide Tank (ARA-736) -- This low-level waste storage tank was used to support reactor research operations until 1965. The tank and piping were removed in 1993.

ARA-19 ARA-II Detention Tank for Fuel Oil/Radionuclides (ARA-719) -- This site is an underground radionuclide detention tank. The tank and piping were removed and disposed of at the Radioactive Waste Management Complex.

ARA-20 ARA-IV Test Area Contaminated Leach Pit No. 1 -- The pit structure was removed in 1983 when the ARA-IV facility underwent decontamination and dismantlement.

ARA-24 ARA-III Windblown Soil -- This site consists of nearly all soils surrounding the ARA-III facility and within the facility fence. Nearly all ARA-III structures have been removed.

PBF-04 PBF Control Area Oil Tank at PBF-608 (Substation) Outside PBF Fence -- The PBF-04 site is an underground storage tank used to store heating fuel; the tank and contaminated soil were removed.

PBF-05 PBF Reactor Area Warm Waste Injection Well (PBF-301) -- This injection well was used to dispose of low-level radioactive waste and raw coolant waste. It was capped and the discharge pipes were sealed with concrete.

PBF-10 PBF Reactor Area Evaporation Pond (PBF-733) -- This pond received secondary coolant water from PBF Reactor operations. In 1994, an interim action excavated sediments from the pond. In 1995, the pond liner was removed and the area was graded and seeded with native grasses.

PBF-11 PBF SPERT-I Seepage Pit (PBF-750) -- The PBF-11 site is a circular seepage pit that received effluent from the Special Power Excursion Reactor Test-I reactor. The reactor was operative from 1955 to 1964.

PBF-12 PBF SPERT-I Leach Pond -- This diked, unlined surface impoundment received overflow from the SPERT-I reactor. The drain line and contaminated soil were removed and the area was backfilled with clean soil.

PBF-15 PBF Reactor Area Corrosive Waste Injection Well (PBF-302) -- This injection well received discharge from regeneration of the PBF Reactor demineralizers and from the PBF Reactor secondary coolant system.

PBF-20 PBF SPERT-III Small Leach Pond -- A small leach pond makes up this site. Located just north of WERF, this pond was used for chemical discharges from SPERT-III demineralizers. It has been backfilled.

PBF-21 PBF SPERT-III Large Leach Pond -- The PBF-21 site is the historical location of a leach pond that received primary coolant water from the SPERT-III Reactor. The pond was characterized and backfilled in 1982.

PBF-22 PBF SPERT-IV Leach Pond (PBF-758) -- This site received radioactively contaminated wastewater, emergency shower water and effluent from the SPERT-IV reactor. Contaminated soil has been removed.

PBF-25 PBF SPERT-IV Septic Tank and Leach Pit (PBF-727, -757) -- The PBF-25 site includes a septic tank and leach pit located southeast of the Mixed Waste Storage Facility. The system is still in use.

PBF-26 PBF SPERT-IV Lake -- This site is an impoundment that received uncontaminated cooling water, uncontaminated effluent from Three Mile Island studies and periodic testing of emergency wash stations.

PBF-30 PBF Reactor Area Abandoned Septic System -- This site includes a septic tank and subsurface drain field that once serviced a construction building. The construction building was demolished in 1971.

PBF-31 SPERT-II Fuel Oil Tank (PBF-732) -- The PBF-31 site was an underground storage tank used to supply heating fuel to the Waste Engineering Development Facility. The tank was removed and replaced in 1994.

PBF-32 PBF Control Area Fuel Oil Tank (PBF-742) -- The PBF-32 site is the location of an underground storage tank used to supply heating fuel to the PBF Control Building. The tank removed and replaced in 1994.

PUBLIC INVOLVEMENT

If you would like a briefing on the Waste Area Group 5 investigation or further information on the descriptions of no action and no further action sites, please call the INEEL Community Relations Office at (208) 526-4700 or the INEEL's toll free number at (800) 708-2680. An opportunity for public comment will be provided during the public meetings on the Operable Unit 5-12 proposed plan in April 1999. Information obtained from previous focus group reviews of proposed plans will be used to shape the Waste Area Group 5 document.

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Address Service Requested